

Remarks

This Amendment is responsive to the Office Action mailed August 2, 2006. The remarks are proper, do not introduce new matter, do not require additional searching, are not narrowing in view of a prior art rejection, and place all pending claims in proper condition for allowance. In an absence of the requested reconsideration, the remarks further serve to explain why this case is not in condition for appeal.

Rejection Under Section 102

Claims 1-21 stand rejected as being anticipated by Lubbers '643. Applicant respectfully traverses this rejection

Claim 1

Applicant respectfully reiterates that Lubbers '643 does not identically disclose *storing first information with first data* (see Applicant's Response of 7/5/2006, ppg. 8-9).

The Examiner parses the recited phrase *storing first information with first data* into two sub-phrases. As for the first sub-phrase, in reading *storing first information* on Lubbers '643 the Examiner cites the following:

Part of the device or member metadata is a forced error box labeled FE, one such box being associated with each disk drive #1-#5. The FE box represents one or more blocks of data.

(Lubbers '643 col. 6 lines 43-46)

As for the second sub-phrase, in reading *with first data* on Lubbers '643 the Examiner cites the following:

In a Raid 5 device, the data is placed on the disks in blocks, for example each of 512 bytes and given a Logical Block Number (LBN). For example, as shown in the table of FIG. 2, block 0, drive #1, block 4, drive #2, block 8 drive #3, block 12, drive #4 and parity in an unnumbered block in drive #5.

(Lubbers '643 col. 5 lines 49-54)

Neither these cited passages nor any other passage of Lubbers '643 identically discloses *storing first information with first data*; at best, the Examiner has established that Lubbers '643 discloses "storing first information and first data."

However, the Examiner attempts to bridge this gap in his case for anticipation by making a completely erroneous statement that mischaracterizes the teaching of Lubbers '643:

Lubbers discloses a table storing blocks of data (see figure 2 and column 5 lines 49-54), indicating first data, along with FE blocks that identify whether data blocks are considered bad (see column 6 lines 50-53), indicating first information that directly indicates the status of the first data. As the first information is stored within the same table as the first data (see column 6 lines 20-25), Lubbers discloses storing first information with first data. (Office Action of 8/2/2006, pg. 8)

Generally, the Examiner's anticipatory rejection is based on the first information being stored with the first data because they are "stored in the same table." This argument is clearly erroneous because the skilled artisan readily understands, consistent with the disclosure of Lubbers '643 and the usage of the term "with" in the specification, that data is not stored with respect to a table; rather, data is stored with respect to blocks (see, for example, Lubbers '643 col. 5 lines 49-51; "the data is placed on the disks in blocks....") The table to which the Examiner refers (FIG. 2 in Lubbers '643) is merely a depiction of how the blocks of stored data are arranged across a plurality of domains, and in the case of a RAID array with parity data how the blocks of stored data interrelate to provide redundancy in storage for error recovery.

There is ample support in the specification that *first information stored with first data* reasonably means the *first information* and the *first data* are stored in the same block, not merely depicted in the same table. See, for example:

When writing new data to a block designated as having unreliable data, controller 120 clears the corresponding FE-bit in FE-bit table 350, writes the data to the device and also writes the associated FE-bit stored on the device. However, storing the FE-bits independently on each device perturbs the use of storage space, particularly the distribution of parity and data in a RAID system with redundancy. Also, writing the data blocks and the FE-bits independently requires extra I/Os to the devices. Likewise, the FE-bit table 350 ultimately uses storage space on media or requires a system where power may never fail, and updating it independently requires additional overhead. (specification, para. [0018])

As is apparent, the present invention has several advantages over the scheme described in FIGS. 3A and 3B. First, the additional accessing of a device to write FE-bit information is not required since the separate FE-bit portions 318, 328, 338 and 348 are eliminated. Furthermore, the need to store the FE-bit table is eliminated. Since the FE-bit table maintenance can consume a substantial amount of processing overhead, such elimination will save critical path CPU cycles. Also, considering that the DRQ bit is automatically retrieved when the data is, there is no real performance degradation to check for it being set, which it usually is not. (specification, para. [0021])

One aspect of the present invention is the elimination of separate FE bit table lookup and I/Os to determine the reliability of a particular piece of data by embedding the DRQ information with the data. The equivalent to the FE bit table information exists, but in a different form--it is distributed or embedded with the data, and its redundancy and distribution is the same as that of the data. This allows the minimization of the performance overhead associated with determining the data reliability. It also allows elimination of the storage mapping complexity (both on disk and in controller memory) associated with a separate FE bit table when compared to other DIF-enabled systems. Another aspect of the present invention is the DRQ bit has the same redundancy as the data, achieved by using the same parity algorithm on the DRQ bit as on the data. (specification, para. [0030])

And although the DRQ bits are disclosed as part of a "Data Integrity Field," the DRQ bit does not have to be contained like that. The DRQ bit can simply be appended (or

preended) to the data, or part of other data appended to the data. This eliminates the case where the data reliability information becomes unavailable, while the data is available (which could certainly happen with a separate FE-bit table), thus having no way to figure out which data is reliable and which is not. With this invention, if the data is available, then the data reliability information is available, and the data's reliability can always be determined. (specification, para. [0032])

Accordingly, the Examiner's claim construction is clearly erroneous in that it is unreasonably broad because it ignores both the plain meaning and the support in the specification of the claim phrase *first information stored with first data*. The Examiner's claim construction unreasonably changes the meaning of this claim phrase to "first information stored and first data," thereby effectively ignoring the explicitly recited claim term *with*. *In re Morris*, 43 USPQ2d 1753 (Fed. Cir. 1997).

The Examiner has not substantiated a prima facie case of anticipation because Lubbers '643 does not identically disclose all the features of claim 1. Applicant is entitled to an evidentiary showing as to how the cited reference anticipates each recited claim element within a construction that is reasonably broad and consistent with term usage in the specification. The Examiner must rectify the unsubstantiated rejection by withdrawing it or showing evidence in the record that Lubbers '643 identically discloses *storing first information with first data* as claimed. Furthermore, the examination resulting in the final rejection is incomplete because the Examiner has failed to consider the patentability of the invention as claimed. 37 CFR 1.104(a). Reconsideration and withdrawal of the final rejection of claim 1 and the claims depending therefrom are respectfully requested.

Absent the requested reconsideration, a Pre-Appeal Brief Panel must find in the underlying facts "substantial evidence" that adequately supports the Examiner's legal conclusion of anticipation. This approach is consonant with the Office's obligation to

develop an evidentiary basis for its factual findings to allow for judicial review under the substantial evidence standard that is both deferential and meaningful. *see In re Lee*, 277 F.3d 1338, 1344 (Fed. Cir. 2002).

Only a travesty of inequities would require Applicant to proceed to appeal in this case on a final rejection based on mischaracterizations of what claim 1 recites and what the cited reference discloses. That is, Applicant should not be burdened with going to appeal to establish that *first information stored with first data* clearly does not reasonably mean “first information stored and first data.” Applicant should also not be burdened with going to appeal to set the record straight that the skilled artisan, having read the specification, reasonably understands that the meaning of *with* is in reference to data being stored in blocks, not data being merely depicted in the same data table. Accordingly, this case is not in condition for appeal due at least to these unresolved factual issues: (1) the Examiner has failed to make the requisite evidentiary showing in the record substantiating a prima facie case of anticipation, (2) the factual mischaracterization of what the claim language recites, and (3) the factual mischaracterization of what the cited reference discloses.

Claims 8 and 15

Similar to the language of claim 1, claims 8 and 15 recite:

accompanying first information with first data....
(excerpt of claim 8, emphasis added)

first information accompanying first data....
(excerpt of claim 15, emphasis added)

For the same reasons as discussed above, the Examiner's claim construction is clearly erroneous because it relates data as being stored with respect to the same table, rather than with respect to the same block:

Lubbers discloses a table storing device specific information (see figure 2 and column 6 lines 18-22) such as ID, indicating first data, and FE blocks, indicating first information accompanying the first data.
(Office Action of 8/2/2006, pg. 8, emphasis added)

As discussed above for claim 1, there is ample support in the specification that *accompanying* and *with* in the context of these claims reasonably means the first information and the first data are in the same block, not merely depicted in the same table.

Accordingly, the Examiner's claim construction is clearly erroneous in that it is unreasonably broad because it ignores both the plain meaning and the support in the specification of the claim phrases *accompanying first information with first data*, and *first information accompanying first data*. The Examiner's claim construction unreasonably changes the meaning of these claim phrases to "first information and first data," thereby effectively ignoring the explicitly recited claim terms *accompanying* and *with*. *In re Morris*, 43 USPQ2d 1753 (Fed. Cir. 1997).

The Examiner has not substantiated a prima facie case of anticipation because Lubbers '643 does not identically disclose all the features of claims 8 and 15. Applicant is entitled to an evidentiary showing as to how the cited reference anticipates each recited claim element within a construction that is reasonably broad and consistent with term usage in the specification. The Examiner must rectify the unsubstantiated rejection by withdrawing it or showing evidence in the record that Lubbers '643 identically discloses *accompanying first information with first data* and *first information accompanying first data* as claimed. Furthermore, the examination resulting in the final rejection is incomplete because the Examiner has failed to consider the patentability of the invention as claimed. 37 CFR 1.104(a). Reconsideration and withdrawal of the final rejection of claims 8 and 15 and the claims depending therefrom are respectfully requested.

Absent the requested reconsideration, a Pre-Appeal Brief Panel must find in the underlying facts “substantial evidence” that adequately supports the Examiner’s legal conclusion of anticipation. This approach is consonant with the Office’s obligation to develop an evidentiary basis for its factual findings to allow for judicial review under the substantial evidence standard that is both deferential and meaningful. *see In re Lee*, 277 F.3d 1338, 1344 (Fed. Cir. 2002).

Only a travesty of inequities would require Applicant to proceed to appeal in this case on a final rejection based on mischaracterizations of what claims 8 and 15 recite and what the cited reference discloses. Again, Applicant should not be burdened with going to appeal, for example, to establish that *accompanying first information with first data* clearly does not reasonably mean “first information and first data.” Applicant should also not be burdened with going to appeal to set the record straight that the skilled artisan, having read the specification, reasonably understands that the meaning of *accompanying* and *with* is in reference to data being stored in blocks, not data being merely depicted in the same data table. Accordingly, this case is not in condition for appeal due at least to these unresolved factual issues: (1) the Examiner has failed to make the requisite evidentiary showing in the record substantiating a prima facie case of anticipation, (2) the factual mischaracterization of what the claim language recites, and (3) the factual mischaracterization of what the cited reference discloses.

Rejection Under Section 102

Claim 1

Applicant respectfully reiterates that Morgan '411 does not identically disclose *the first information directly indicates the status of the first data* (see Applicant's Response of 7/5/2006, ppg. 10-11).

The Examiner's basis for anticipation relies on reading the language of claim 1 onto the retrospective event log disclosed in Morgan '411:

If such a data transfer is occurring, predetermined code bits of the code byte are set at step 94 providing an indication that this data transfer is occurring. In step 98, a determination is made as to whether or not this data transfer was successfully completed. If successful, at step 102, the predetermined code bits that were previously set are now reset so that no inaccurate fault indication exists in the predetermined code bits. On the other hand, if the data transfer was not successfully completed, the code bits remain set.

(Morgan '411 col. 6 lines 18-28, emphasis added, Examiner cited lines 23-28)

The skilled artisan reading Morgan '411 clearly understands that its predetermined code bits do not directly indicate the status of data, but rather indicate which step in the process a failure occurred, after-the-fact and regardless of the status of the data being operated upon:

The identity of the faulty operation is indicated using predetermined code bits that identify the particular data transfer operation that was taking place at the time of the fault.

(Morgan '411, col. 5 lines 42-45, emphasis added)

The set code bits are accessed using error recovery routines and the accessed code bits are used in generating failure data that is utilized by service personnel in taking corrective action at step 106. It should be understood that the setting and unsetting (re-setting) of the predetermined code bits refers to, respectively, setting the bits to preselected values, one per each operation whose failure is to be detected, and, unsetting the bits to some preselected value indicating no failed operation...Thus, determination can be made as to which data operation was taking place when the fault occurred.

(Morgan '411, col. 6 lines 28-52, emphasis added)

Neither the cited passage nor any other passage of Morgan '411 identically discloses *first information directly indicates the status of the first data*; at best, the Examiner has established that Morgan '411 discloses "first information retrospectively indicating the status of a process step."

There is ample support in the specification that *directly indicates the status of first data* is different than "retrospectively indicates the status of a process step." For example, by *directly indicat(ing) the status of the first data*, a process step using the data can be precluded prospectively, thereby preventing errors in the process. See, for example:

FIG. 6B shows when device 620 is inoperative and data block 12 of device 640 is unreliable. As described above, if a read request is made that accesses inoperative device 620, the storage system controller receives data blocks P4, 11 and 12 from respective devices 610, 630 and 640. The controller will perform error detection of each block to ensure that the data is "good". If any of the data is not "good", then the controller informs the host environment that the read cannot be performed. (specification, para. [0026], emphasis added)

Accordingly, the Examiner's claim construction is clearly erroneous in that it is unreasonably broad because it ignores both the plain meaning and the support in the specification of the claim phrase *directly indicates the status of the first data*. The Examiner's claim construction unreasonably changes the meaning of this claim phrase to "retrospectively indicates the status of a process step," thereby effectively ignoring the explicitly recited claim language. *In re Morris*, 43 USPQ2d 1753 (Fed. Cir. 1997).

The Examiner has not substantiated a prima facie case of anticipation because Morgan '411 does not identically disclose all the features of claim 1. Applicant is entitled to an evidentiary showing as to how the cited reference anticipates each recited claim element

within a construction that is reasonably broad and consistent with term usage in the specification. The Examiner must rectify the unsubstantiated rejection by withdrawing it or showing evidence in the record that Morgan '411 identically discloses *directly indicates the status of the first data* as claimed. Furthermore, the examination resulting in the final rejection is incomplete because the Examiner has failed to consider the patentability of the invention as claimed. 37 CFR 1.104(a). Reconsideration and withdrawal of the final rejection of claim 1 and the claims depending therefrom are respectfully requested.

Absent the requested reconsideration, a Pre-Appeal Brief Panel must find in the underlying facts "substantial evidence" that adequately supports the Examiner's legal conclusion of anticipation. This approach is consonant with the Office's obligation to develop an evidentiary basis for its factual findings to allow for judicial review under the substantial evidence standard that is both deferential and meaningful. *see In re Lee*, 277 F.3d 1338, 1344 (Fed. Cir. 2002).

Only a travesty of inequities would require Applicant to proceed to appeal in this case on a final rejection based on mischaracterizations of what claim 1 recites and what the cited reference discloses. That is, Applicant should not be burdened with going to appeal to establish that *directly indicates the status of the first data* clearly does not reasonably mean "retrospectively indicate the status of a process step." Accordingly, this case is not in condition for appeal due at least to these unresolved factual issues: (1) the Examiner has failed to make the requisite evidentiary showing in the record substantiating a prima facie case of anticipation, (2) the factual mischaracterization of what the claim language recites, and (3) the factual mischaracterization of what the cited reference discloses.

Claims 8 and 15

Applicant respectfully reiterates that Morgan '411 does not identically disclose *the first information indicates status of second data associated with the first data* as recited by claims 8 and 15 (see Applicant's Response of 7/5/2006, ppg. 10-11).

The Examiner's basis for anticipation, as understood, is that the block of data to which Morgan '411 appends its code bits, when reconfigured, becomes "second data" even though it's the same block of data:

Morgan discloses blocks of data with code byte and check bytes, indicating accompanying first information with first data (see column 5 lines 60-65). Morgan further discloses a block of configured data (see column 5 lines 55-60), indicating second data. Morgan further discloses the code byte is reset to indicate the data transfer was successful, which indicates no fault in the configured data (see column 6 lines 23-28), indicating first information indicates status of second data associated with the first data. (Office Action of 8/2/2006, ppg. 9-10, emphasis added)

However, the skilled artisan reading Morgan '411 clearly understands that the "first data" and the "second data" to which the Examiner refers is the same block of data. That is, there is a one-to-one correspondence of code bits to its respective data block; the code bits never indicate the status of any other data block in Morgan '411. Neither the cited passages nor any other passage of Morgan '411 identically discloses *first information indicates status of second data associated with the first data*; at best, again, the Examiner has established that Morgan '411 discloses "first information retrospectively indicates the status of a process step."

There is ample support in the specification that *first information indicates status of second data associated with the first data* is different than "first information retrospectively indicates the status of a process step." For example, by storing the DRQ with the respective data block the RAID redundancy scheme can be utilized to optimize processing throughput:

Portion 424A, according to the present invention, contains a "Data Reliability Qualifier" or DRQ-bit that qualifies not only the data in data portion 410 but all redundant copies of that data. The DRQ flag is logically appended to the contents of the data block and maintained with identical redundancy as the bits in the data portion. It should be viewed as a copy of "logical metadata" in the same sense as the data portion is considered a copy, with possible redundancy, of a "logical block" of a "logical unit" created using any of the techniques known as "virtualization". Portion 424A can contain additional metadata bits that qualify the data. Some of these bits may also be "logical metadata" and maintained with identical redundancy to the data bits. Some of these bits may be "physical metadata" and apply only to the particular copy to which they are appended. For example, portion 424A can contain a "Parity" flag bit, set to "0" (or "FALSE") for data blocks 400, that indicates that the block in question contains some form of parity for other user data blocks.
(specification, para. [0019], emphasis added)

Accordingly, the Examiner's claim construction is clearly erroneous in that it is unreasonably broad because it ignores both the plain meaning and the support in the specification of the claim phrase *first information indicates status of second data associated with the first data*. The Examiner's claim construction unreasonably changes the meaning of this claim phrase to "first information retrospectively indicates the status of a process step," thereby effectively ignoring the explicitly recited claim language. *In re Morris*, 43 USPQ2d 1753 (Fed. Cir. 1997).

The Examiner has not substantiated a prima facie case of anticipation because Morgan '411 does not identically disclose all the features of claims 8 and 15. Applicant is entitled to an evidentiary showing as to how the cited reference anticipates each recited claim element within a construction that is reasonably broad and consistent with term usage in the specification. The Examiner must rectify the unsubstantiated rejection by withdrawing it or showing evidence in the record that Morgan '411 identically discloses *first information*

indicates status of second data associated with the first data as claimed. Furthermore, the examination resulting in the final rejection is incomplete because the Examiner has failed to consider the patentability of the invention as claimed. 37 CFR 1.104(a). Reconsideration and withdrawal of the final rejection of claims 8 and 15 and the claims depending therefrom are respectfully requested.

Absent the requested reconsideration, a Pre-Appeal Brief Panel must find in the underlying facts “substantial evidence” that adequately supports the Examiner’s legal conclusion of anticipation. This approach is consonant with the Office’s obligation to develop an evidentiary basis for its factual findings to allow for judicial review under the substantial evidence standard that is both deferential and meaningful. *see In re Lee*, 277 F.3d 1338, 1344 (Fed. Cir. 2002).

Only a travesty of inequities would require Applicant to proceed to appeal in this case on a final rejection based on mischaracterizations of what claims 8 and 15 recite and what the cited reference discloses. That is, Applicant should not be burdened with going to appeal to establish that *first information indicates status of second data associated with the first data* clearly does not reasonably mean “first information retrospectively indicates the status of a process step.” Accordingly, this case is not in condition for appeal due at least to these unresolved factual issues: (1) the Examiner has failed to make the requisite evidentiary showing in the record substantiating a prima facie case of anticipation, (2) the factual mischaracterization of what the claim language recites, and (3) the factual mischaracterization of what the cited reference discloses.

Conclusion

This is a complete response to the Office Action mailed August 2, 2006. The

Applicant respectfully requests that the Examiner reconsider the application and withdraw the final rejections. The Applicant has submitted herewith a request for interview at a time to be determined by the Examiner, if after reviewing this request for reconsideration it is determined that all pending claims are not in condition for allowance, but before the next action on the merits. The interview is necessary to clarify the unresolved issues in the case making this case currently not in condition for appeal.

Respectfully submitted,

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